

ORIGINAL

Carmen Madrid



From: Valorie Nimmo on behalf of Utilities Div - Mailbox
Sent: Wednesday, May 16, 2012 3:41 PM
To: Carmen Madrid
Subject: FW: APS Customer Commentary, Docket # E-OOOOOC-11-0328 Subject: EHS, MS, Type 3 Diabetes
Attachments: MS & EHS_ACC.pdf; ATT00001..htm; 06_Havas_EBM.pdf; ATT00002..htm; Type 3 Diabetes.pdf; ATT00003..htm

From: Patricia Ferre [mailto:plcferre@me.com]
Sent: Wednesday, May 16, 2012 10:07 AM
To: Pierce-Web; Newman-Web; Burns-Web; Kennedy-Web; Stump-Web; Utilities Div - Mailbox
Subject: APS Customer Commentary, Docket # E-OOOOOC-11-0328 Subject: EHS, MS, Type 3 Diabetes

Patricia C. Ferre

APS Customer Commentary

Please add this to my testimony given on 3/23/2012 at the ACC Workshop
on Meter Guidelines,

Docket # E-OOOOOC-11-0328

MS & EHS Symptoms Overlap – Dr. Magda Havas PhD

Arizona Corporation Commission
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Patricia C. Ferre
APS Customer Commentary
Please add this to my testimony given on 3/23/2012 at the ACC
Workshop on Meter Guidelines,
Docket # E-00000C-11-0328

MULTIPLE SCLEROSIS & ELECTROHYPERSENSITIVITY¹

Dr. Magda Havas PhD



Multiple sclerosis (MS) is a neurological disorder and many of the symptoms overlap with electrohypersensitivity (EHS). Indeed some individuals with EHS may be misdiagnosed with MS and some may have both "diseases."

In a study we conducted a few years ago, we found that some people diagnosed with MS improved when power quality was improved in their home environment. Subjects documented better sleep, more energy, clarity of thought, improved balance and motor coordination, better mood among other symptoms. Changes were documented within a matter of days and weeks. However, not everyone who participated in this study noticed benefits.

¹ 6/18/2011 Dr. Magda Havas PhD <http://www.magdahavas.com/multiple-sclerosis-and-electrohypersensitivity/>

One might expect that people who have a compromised nervous system and an impaired immune system may be particularly vulnerable to electromagnetic energy. MS patients have both. The myelin sheath around nerves cells in the brain and spinal cord are damaged and this is believed to be an autoimmune response.



More research needs to be done in this area to determine what percent of the MS population is electrically hypersensitive and what frequencies they may be responding to. By reducing their exposure to radio frequency radiation and other forms of electrosmog and by practicing good electromagnetic hygiene they may be able to get relief from their symptoms and some may be able to delay, halt or reverse the progression of this disease.

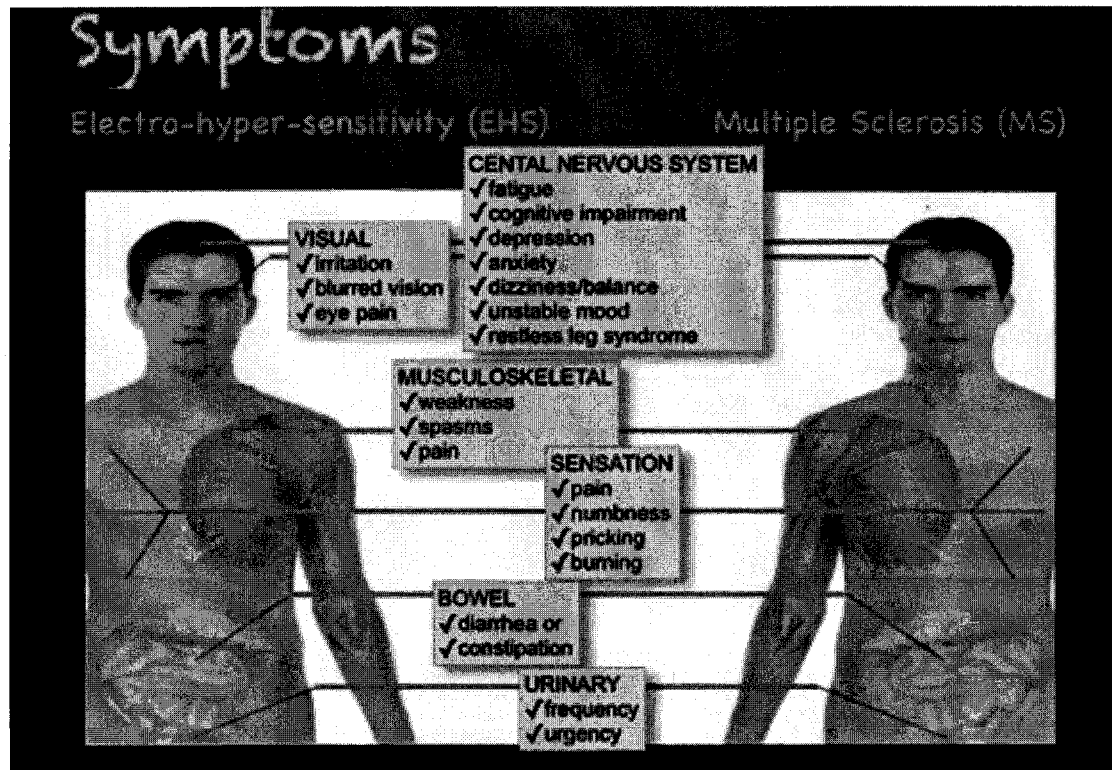
Here are some tips on how to practice good electromagnetic hygiene.

1. replace cordless phone with corded phone
2. replace WiFi with ethernet cable for computer
3. use cellphone as little as possible & only in speaker mode
4. do NOT use compact fluorescent light bulbs
5. do NOT use electric blankets or water beds
6. keep alarm clock radios at least 2 meters from bed
7. measure radio frequency in your home & install radio frequency-reflecting window film or fabric to shield from external sources
8. measure dirty electricity in your home & install filters if

values are above 50 GS units.

9. ask utility to install “wired” smart meter (not wireless)

10. do not live in a home within 100 m of transmission lines
or within 400 m of cell phone antennas.



EHS & MS common symptoms from “**Multiple Sclerosis and Dirty Electricity**” video: <http://youtu.be/xdtIPb3Veuw>

Attachment: peer-reviewed publication: Havas. M. 2006. Electromagnetic Hypersensitivity: Biological Effects of Dirty Electricity with Emphasis on Diabetes and Multiple Sclerosis. Electromagnetic Biology and Medicine, 25:259-268.²

Respectfully submitted,

Patricia Ferre

² informa healthcare http://www.magdahavas.com/wordpress/wp-content/uploads/2011/01/06_Havas_EBM.pdf

Electromagnetic Hypersensitivity: Biological Effects of Dirty Electricity with Emphasis on Diabetes and Multiple Sclerosis

MAGDA HAVAS

Environmental and Resource Studies, Trent University, Peterborough,
Ontario, Canada

Dirty electricity is a ubiquitous pollutant. It flows along wires and radiates from them and involves both extremely low frequency electromagnetic fields and radio frequency radiation. Until recently, dirty electricity has been largely ignored by the scientific community. Recent inventions of metering and filter equipment provide scientists with the tools to measure and reduce dirty electricity on electrical wires. Several case studies and anecdotal reports are presented. Graham/Stetzer (GS) filters have been installed in schools with sick building syndrome and both staff and students reported improved health and more energy. The number of students needing inhalers for asthma was reduced in one school and student behavior associated with ADD/ADHD improved in another school. Blood sugar levels for some diabetics respond to the amount of dirty electricity in their environment. Type 1 diabetics require less insulin and Type 2 diabetics have lower blood sugar levels in an electromagnetically clean environment. Individuals diagnosed with multiple sclerosis have better balance and fewer tremors. Those requiring a cane walked unassisted within a few days to weeks after GS filters were installed in their home. Several disorders, including asthma, ADD/ADHD, diabetes, multiple sclerosis, chronic fatigue, fibromyalgia, are increasing at an alarming rate, as is electromagnetic pollution in the form of dirty electricity, ground current, and radio frequency radiation from wireless devices. The connection between electromagnetic pollution and these disorders needs to be investigated and the percentage of people sensitive to this form of energy needs to be determined.

Keywords Diabetes; Dirty electricity; Electromagnetic hypersensitivity; Multiple sclerosis; Power quality; Radio frequency.

Introduction

Most of the research on the biological effects of nonionizing radiation is done at one of two frequency ranges: extremely low frequency (ELF) associated with electricity (50/60 Hz) and radio frequency (RF) associated with wireless telecommunication

Address correspondence to Magda Havas, Environmental and Resource Studies, Trent University, 1600 West Bank Drive, Peterborough, ON K9J 7B8, Canada; E-mail: mhavas@trentu.ca

devices (800 MHz to 2.5 GHz range). An intermediate frequency range, at the low end of the RF spectrum (kHz), flows along and radiates from wires (dirty electricity) and thus has characteristics of the two major types of electromagnetic pollution mentioned above. Scientists doing research on the biological effects of power line frequencies seldom measure this frequency range and thus ignore the effects it might have on health.

Recent advances in filtering technology (Graham/Stetzer or GS filters) and measuring equipment (microsurge meter) enable scientists to test for dirty electricity and to reduce it on indoor wires. In this article, case studies are presented of individuals who have benefited after the dirty electricity in their environment was reduced. This technology provides scientists with the tools to monitor, reduce, and experiment with a frequency range that, until now, has been largely ignored and it may help those who suffer from symptoms of electromagnetic hypersensitivity (EHS).

Dirty Electricity

Poor power quality, also known as dirty electricity, has been a concern for the electric utility for decades. Dirty electricity refers to electromagnetic energy that flows along a conductor and deviates from a pure 60-Hz sine wave (Figure 1). It has both harmonic and non harmonic (transient) components and emerged as a problem in the late 1970s with the increasing use of electronic devices that produce nonlinear loads. Karl Stahlkopf, a vice president of the Electric Power Research Institute (EPRI), estimates that dirty power costs U.S. industry between \$4 and \$6 billion a year, and that it is likely to get worse before it can be mitigated. EPRI expects that 70% of all electricity produced within the U.S. will flow through electronic devices by 2002, compared with 30% in 1999 (Fortune, 1999).

Dirty electricity is ubiquitous. It is generated by electronic equipment such as computers, plasma televisions, energy efficient appliances, dimmer switches, as

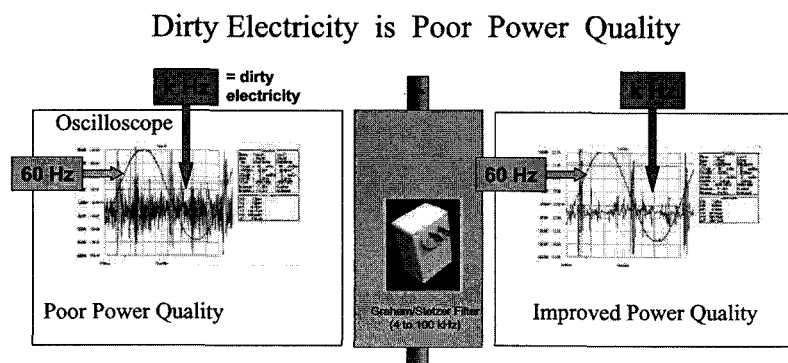


Figure 1. Visual display of dirty electricity (kHz range) and 60 Hz power frequency without (left) and with (right) Graham/Stetzer filters. A 2-channel Fluke 199 Scopemeter was attached to a ubiquitous filter to separate the 60 Hz frequency from the dirty electricity (Graham, 2000). The improved power quality has fewer spikes and smaller amplitude for the high frequency transients. The GS filters have no effect on the 60 Hz sine wave.

Sources of Dirty Electricity

- computers
- variable speed motors
- television sets
- entertainment units
- energy efficient lighting
- energy efficient appliances
- dimmer switches
- power tools
- arcing on hydro wires
- neighbors
- cell phone antennas
- broadcast antennas

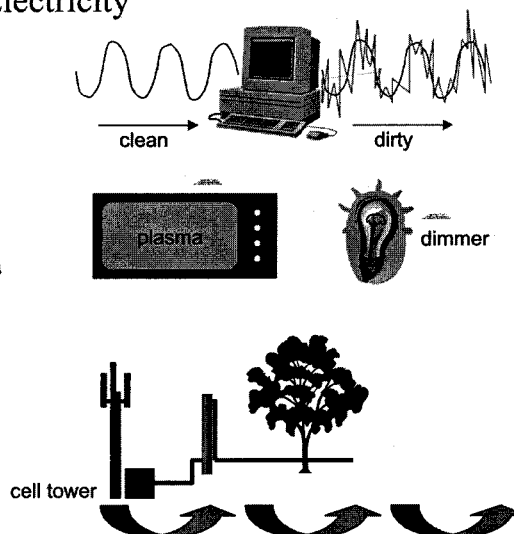


Figure 2. Sources of dirty electricity include electronic equipment and appliances, arcing on wires, and unfiltered cell phone and broadcast frequencies from nearby antennas.

well as arcing on electrical conductors caused by loose wires or contact with trees (Figure 2). Dirty electricity is thus produced within buildings but can also enter buildings from neighbors who share the same transformer. Mobile or broadcast antennas, if not properly filtered, can also contribute to high frequencies on electrical wires in nearby buildings.

The IEEE 519-1992 recommends installing filters to control harmonic distortions on power lines. With 5kV and higher voltage distribution lines the IEEE identifies voltage notching, which produces both harmonic and nonharmonic frequencies in the radio frequency (RF) range and, as such, can introduce harmful effects associated with spurious RF. Industry uses large capacitors to protect sensitive equipment from power surges, especially in production line work, where malfunctions and down time are costly. Until now filters have not been available for in home use.

Professor Martin Graham from UC Berkeley and power quality expert, Dave Stetzer, President of Stetzer Electric in Wisconsin, have designed a filter that can be used inside buildings to clean the power that enters the building as well as the dirty electricity generated within the building. The Graham/Stetzer (GS) filter is a compact unit that plugs into an electrical outlet (Figure 3). It contains an electrical capacitor that shorts-out the high frequency transients on the circuit and is most effective when placed close to the appliance generating the dirty electricity. The GS filter has optimum filtering capacity between 4 and 100kHz (Graham, 2000, 2002).

In Russia, the safety guidelines for electric and magnetic field exposure are frequency specific. For frequencies between 5 Hz and 2 kHz, the guideline is 25 V/m for electric fields and 0.25 μ T (2.5 mG) for magnetic fields. For frequencies between 2 and 400 kHz, the guidelines are lower by a factor of 10. Since energy is proportional to frequency, the energy is 1,000 times higher at 60 kHz than it is at 60 Hz.

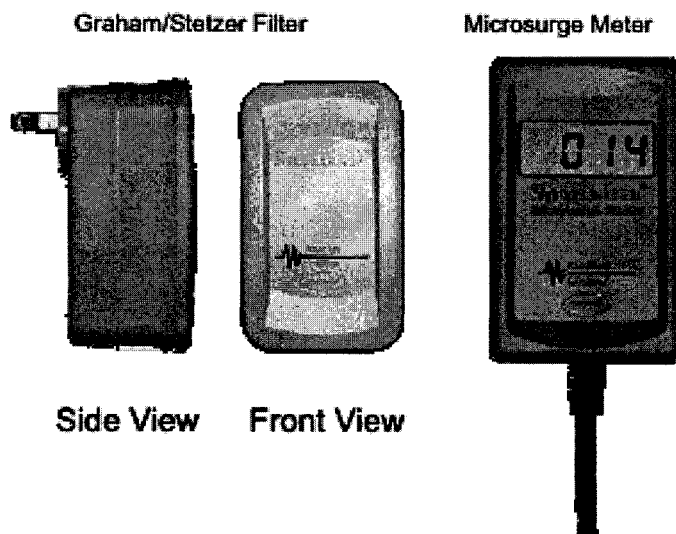


Figure 3. Equipment used to reduce and monitor dirty electricity inside buildings: the Graham/Stetzer filter and the microsurge meter.

The microsurge meter (Figure 3), also designed by Graham and Stetzer, measures the energy associated with dirty electricity in GS units with a range from 1 to 1999 and an accuracy of $\pm 5\%$ (Graham, 2003). The Health Department of the Republic of Kazakhstan (2003) has stated that any reading on the microsurge meter exceeding 50 is unacceptable and steps must be taken to lower such readings. Experience with this meter suggests that values below 30 GS units are undesirable and that extremely sensitive individuals may not see any benefits until the values are at or below 20 GS units. In some extremely dirty environments it is not possible to achieve such low values.

In the following, a number of case studies are presented.

Case Studies

GS filters have been placed in homes, offices, and schools. People report having better sleep, more energy, and less pain. They document cognitive improvements in memory and concentration. Symptoms of radio wave sickness or electrical hypersensitivity (Table 1) are often reduced or eliminated in the filtered environment.

GS filters placed in one Wisconsin school that had sick building syndrome, significantly improved power quality. Shortly after the filters were installed, the health and energy level of staff and students began to improve. According to the District Nurse, of the 37 students in the school who used inhalers on a daily basis, only 3 required inhalers and only for exercise-induced asthma after the filters were in place (Sbraggia, 2002).

GS filters were placed in a Toronto school and approximately 50% of the teachers documented improvements in energy, performance, mood, and/or health in a single blind study (Havas et al., 2004). Student behavior, especially at the elementary level, also improved. The symptoms that changed were ones we associate

Table 1

Symptoms of radio wave sickness first documented among radar workers during the Second World War resemble those now associated with electromagnetic hypersensitivity

Symptoms of radio wave sickness* (Firstenberg, 2001)

Neurological: Headaches, dizziness, nausea, difficulty concentrating, memory loss, irritability, depression, anxiety, insomnia, fatigue, weakness, tremors, muscle spasms, numbness, tingling, altered reflexes, muscle and joint pain, leg/foot pain, "flu-like" symptoms, fever. More severe reactions can include seizures, paralysis, psychosis, and stroke.

Cardiac: Palpitations, arrhythmias, pain or pressure in the chest, low or high blood pressure, slow or fast heart rate, shortness of breath.

Respiratory: Sinusitis, bronchitis, pneumonia, asthma.

Dermatological: Skin rash, itching, burning, facial flushing.

Ophthalmologic: Pain or burning in the eyes, pressure in/behind the eyes, deteriorating vision, floaters, cataracts.

Others: Digestive problems, abdominal pain, enlarged thyroid, testicular/ovarian pain, dryness of lips, tongue, mouth, eyes, great thirst, dehydration, nosebleeds, internal bleeding, altered sugar metabolism, immune abnormalities, redistribution of metals within the body, hair loss, pain in the teeth, deteriorating fillings, impaired sense of smell, ringing in the ears.

*Note: These symptoms resemble symptoms associated with electrical hypersensitivity.

with attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD). This begs the question, "How much of the increase in ADD/ADHD among young people is due to electromagnetic pollution and poor electromagnetic hygiene?"

People with situational tinnitus (ringing in the ears that is present only in certain environments, often where RF is present) have documented improvements as well after the filters were installed in their home, as have those individuals who are otherwise healthy (Havas and Stetzer, 2004). Two diseases we seldom associate with electromagnetic hypersensitivity are diabetes and multiple sclerosis (MS). What follows are case studies that document the response to dirty electricity of diabetics and those with MS.

Diabetes

Two case studies are presented. (1) A 51-year old male with Type 2 diabetes who does not take medication and (2) an 80-year old female with Type 1 diabetes who takes insulin twice a day. A 51-year old male with Type 2 diabetes monitored dirty electricity in his environment and his blood sugar levels randomly throughout the day for approximately one month in 2003. The microsurge meter was not yet available to measure dirty electricity so he used a Protek 506 Digital Multimeter and measured the peak-to-peak voltage. His blood sugar levels were positively correlated with the amount of dirty electricity in his environment (Figure 4). One day he was

Type 2 Diabetes

51-year old male diabetic: April 23 to May 29, 2003 [minus 1 data point]

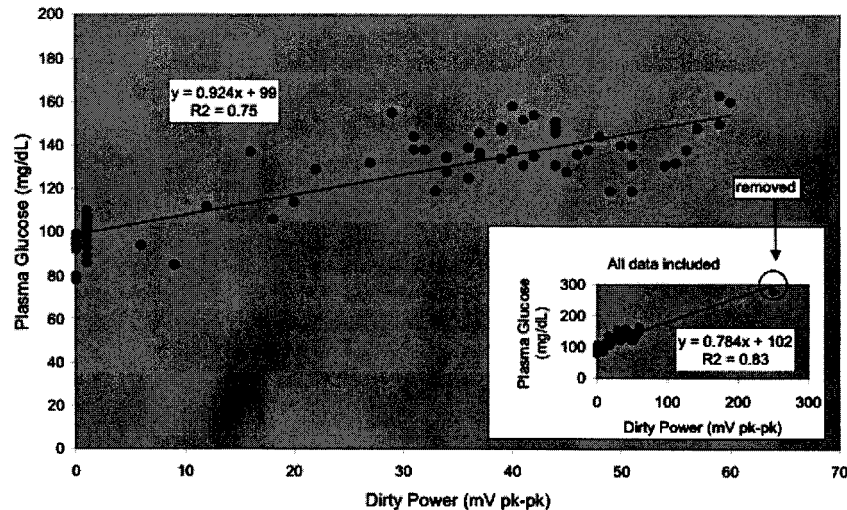


Figure 4. Fifty-one year old male with Type 2 diabetes. His plasma glucose levels correlate with the dirty electricity in his environment. Insert shows exposure on one day to a very high level of dirty electricity and this is reflected in elevated blood sugar.

exposed to very high levels of dirty electricity and this was reflected in exceptionally high levels of blood sugar. He noticed that his blood sugar levels remained low when he was in his truck away from power lines and antennas and when he was in a wilderness setting. In an electromagnetically dirty environment his blood sugar levels would increase within minutes.

An 80-year old female with Type 1 diabetes, who monitors her blood sugar twice daily—once in the morning upon awakening (fasting plasma glucose) and once in the evening before supper—had her home in Arizona filtered by an electrician. He was able to reduce the dirty electricity in her home from an average of 800 GS units to 13 GS units. As soon as the dirty electricity in her home was reduced, her blood sugar began to drop. Her average fasting plasma glucose levels without the filters was 171 mg/dL and this dropped to an average of 119 with the filters (Figure 5). During this period her insulin injections were reduced from a daily average of 36 units to 9 units.

Her evening plasma glucose did not change after the filters were installed in her home but they did change on days she spent away from home. Levels were particularly high after spending time in a casino. Casinos are likely to have high levels of dirty electricity but stress may also have contributed to higher levels of blood sugar (Hinkle and Wolf, 1950).

Multiple Sclerosis

One teacher in the Wisconsin school that was filtered had been diagnosed with multiple sclerosis (MS). She was extremely tired, had double vision, had cognitive

Type 1 Diabetes, 80 year-old female

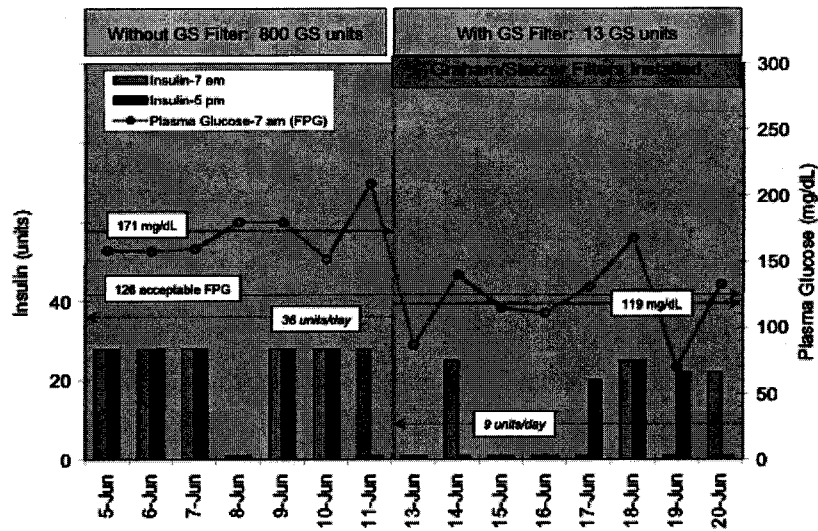


Figure 5. Eighty-year old female with Type 1 diabetes, who takes insulin twice daily. Fasting plasma glucose levels and insulin injections with and without Graham/Stetzer filters are shown.

difficulties and could not remember the names of the students in her 4th grade class. Her health would improve during the summer but her symptoms returned in September. She assumed her problems were mold-related but her symptoms did not improve after the mold was removed from the school. Once the school was filtered her symptoms disappeared. Similar stories prompted studies with people who had MS.

Havas began to work with people diagnosed with MS, who had difficulty walking and who used canes or walkers. The first person she worked with noticed improvements within 24 h. At that stage Havas assumed this was a powerful placebo effect but the subject's symptoms continued to improve weekly and regressed only during wet weather, which had always been a problem for this subject. Several other people with MS were able to walk unassisted after a few days to weeks with the GS filters and Havas began to videotape those who gave her permission to do so.

One of those individuals is a 27-year old male who had been diagnosed with primary progressive MS two years earlier. He walked with a cane or did "wall walking" at home (holding onto the wall or furniture for balance). He had tremors, was exceptionally tired, and was beginning to have difficulty swallowing. Three days after 16 GS filters were placed in his home his symptoms began to disappear. The dirty electricity in his home was reduced from 135–410 GS units to 32–38 GS units. He assumed his body was recovering spontaneously but he had been diagnosed with progressive MS and not relapsing/remitting MS, so spontaneous recovery was unlikely in his case.

A week after the filters were installed in his home he had enough energy to go shopping with his father. He did not take his cane because he had not needed it, but

Multiple Sclerosis: 27-year old male with primary progressive MS

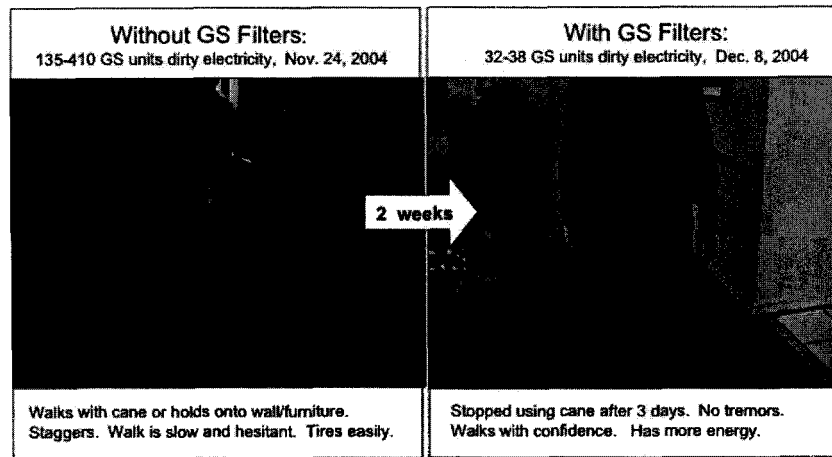


Figure 6. Video-clip of 27-year old male with primary progressive multiple sclerosis, diagnosed two years earlier. In the video on left (without Graham/Stetzer filters), he walks slowly and is hesitant. In the video on the right (two weeks after Graham/Stetzer filters were installed in his home), he walks with confidence and is well coordinated.

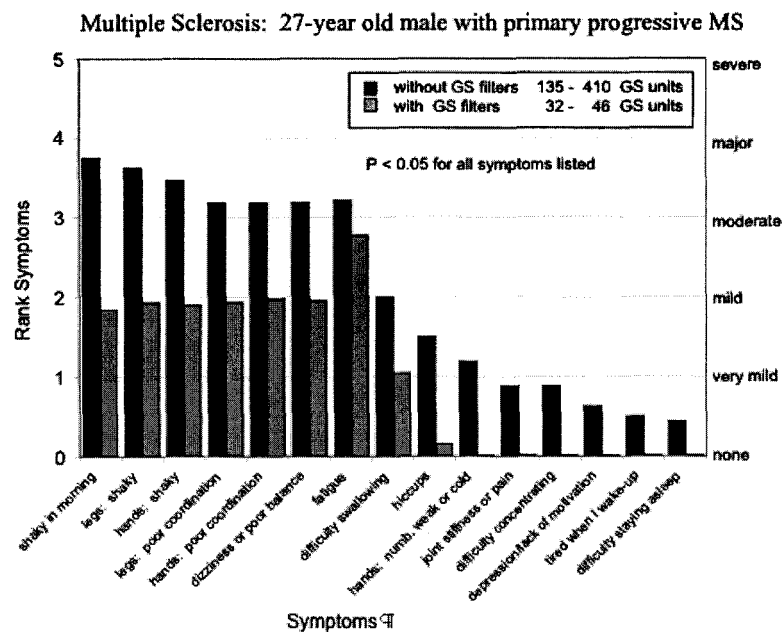


Figure 7. Symptoms of 27-year old male with primary progressive multiple sclerosis with and without Graham/Stetzer filters in his home.

after a couple of hours in the store his symptoms reappeared and he had difficulty walking to the car. His tremors began to subside three hours after arriving home. This experience has been repeated on several occasions and he now knows that if he goes into an environment with dirty electricity his MS symptoms reappear.

Figure 6 is taken from a video before the filters were installed in his home and two weeks later. Prior to the filters his walk was stilted and slow. He staggered and resembled the gait of someone who was intoxicated. Two weeks after the filters were installed his walk was normal with no signs of MS. During this period he began to put on weight, was sleeping better, and had fewer tremors and more energy (Figure 7).

Some other observations that are notable is that his mother had been suffering from hot flashes at night associated with menopause and these came to an end after the filters were installed and his father experienced several episodes of vertigo weekly and these became less frequent.

Conclusions

These case studies and anecdotal reports suggest that dirty electricity is biologically active. Once dirty electricity is reduced, people's health improves. For some it is reflected in more normal blood sugar levels, for others symptoms of MS are reduced, and for still others tinnitus disappears and behavior resembling ADD/ADHD improves. Since dirty electricity is becoming ubiquitous large fractions of the population are being exposed to this pollutant and some are being adversely affected.

Diabetes, multiple sclerosis, ADD/ADHD, asthma chronic fatigue, and fibromyalgia are all increasing in the population and the reasons for this increase are poorly understood. Dirty electricity may be one of the contributors to these illnesses.

According to Philips and Philips (2006) 3% of the population has electromagnetic hypersensitivity (EHS) and 35% have symptoms of EHS. If these percentages apply to diabetics then as many as 5–60 million diabetics worldwide may be responding to the poor power quality in their environment (Wild et al., 2004). Evidence from laboratory studies documents that insulin release and insulin-binding capacity to receptors cells is reduced by electromagnetic fields (Li et al., 2005; Sakurai et al., 2004). It is further known that stress increases blood sugar levels in diabetics and that exposure to electromagnetic energy induces stress proteins at various frequencies (Blank and Goodman, 2004; Hinkle and Wolf, 1950).

Dirty electricity can now be monitored with meters and reduced with filters, providing scientists with the tools needed for research. What is presented here is a handful of studies, many preliminary, with dramatic results. This area warrants further investigation to determine the mechanisms involved and the percentage of the population affected.

Conflict of Interest

Please note that the author has no vested interest, financial or otherwise, in the commercial devices discussed in this article.

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Type 3 Diabetes Influenced by Electromagnetic Pollutants

Patricia C. Ferre

APS Customer Commentary

Please add this to my testimony given on 3/23/2012

at the ACC Workshop on Meter Guidelines,

Docket # E-00000C-11-0328

DIABETES AND ELECTROSENSITIVITY¹

If you have difficulty regulating your blood sugar and you are electrically sensitive you may have type 3 diabetes according to research published in the Journal Electromagnetic Biology and Medicine in 2008.

Unlike Type 1 diabetes (juvenile diabetes) that is largely genetically controlled, and Type 2 diabetes (adult onset) that increases with obesity, **Type 3 diabetes is influenced by environmental exposure to electromagnetic pollutants.**

In this peer-reviewed article, 4 case studies are presented that show marked changes in blood sugar associated with dirty electricity. Since so few people read scientific articles, I converted this paper into a short video called Diabetes and Electrosensitivity. [<http://youtu.be/gJcM6RZwyfA>]

If you or a loved one has diabetes, please watch this video. Share the information with your doctor. Clean up your electromagnetic environment and that includes, not only dirty electricity but also, radiation from wireless technology.

We do not know how many people have type 3 diabetes (environmentally influenced blood sugar) nor do we know the environmental triggers.

If you have problems regulating your blood sugar and/or suspect you might be electrically sensitive, visit the new website: www.electrosensitivesociety.com and share your information with other members.

Respectfully submitted,
Patricia Ferre

¹ Dr. Magda Havas, PhD www.magdahavas.com/diabetes-and-electrosensitivity/

Carmen Madrid

From: Valorie Nimmo on behalf of Utilities Div - Mailbox
Sent: Wednesday, May 16, 2012 3:41 PM
To: Carmen Madrid
Subject: FW: APS Customer Commentary - Workshop on Meter Guidelines, Docket # E-OOOOOC-11-0328
Attachments: May 15 ACC Havas letter.pdf; ATT00001..htm; Havas-Report-CCST-Smart-Meters.pdf; ATT00002..htm

From: Patricia Ferre [mailto:pferreact@mac.com]
Sent: Tuesday, May 15, 2012 3:22 PM
To: Pierce-Web; Newman-Web; Burns-Web; Kennedy-Web; Stump-Web; olea-web@azcc.gov
Cc: Utilities Div - Mailbox
Subject: APS Customer Commentary - Workshop on Meter Guidelines, Docket # E-OOOOOC-11-0328

ATT: eDocket # E-OOOOOC-11-0328

Workshop on Meter Guidelines - Please post on eDocket as an extension of my Workshop on Meter Guidelines, Docket # E-OOOOOC-11-0328

Cover letter - 2 page PDF

May 15, 2012

Arizona Corporation Commission
Docket Control Center
1200 West Washington Street
Phoenix, AZ 85007

RE: AZ Corporation Commission Docket # E-00000C-11-0328

Dear Commissioners and Mr. Olea,

I here submit the testimony of Dr. Magda Havas, PhD to the CCST "Report on Smart Meters." The attached five page PDF document titled "Havas Submission to CCST "Report on Smart Meters" is Dr. Havas' assessment, as an expert on the technical safety concerns of Smart Meters.

On July 30, 2010, California State Assembly Member Jared Huffman (San Rafael) asked the California Council on Science and Technology (CCST) to provide an assessment of the safety of Smart Meters.

On August 16, 2010, CCST agreed to compile and assess the evidence available to address the following two issues:

1. Whether FCC standards for Smart Meters are sufficiently protective of public health taking into account current exposure levels to radiofrequency and electromagnetic fields.
2. Whether additional technology specific standards are needed for Smart Meters and other devices that are commonly found in and around homes, to ensure adequate protection from adverse health effects.

According to Dr. Magda Havas, PhD's website, on October 4, 2010, Dr. Havas was invited to be part of a Technical Response Team and, as part of that team, she was asked to provide a written response to two key concerns mentioned

above. On October 12, 2010, Dr. Havas submitted her report to CCST.¹²

Dr. Magda Havas states on her webpage, "My submission does not support the final conclusions in the CCST report... My overall conclusions are as follows:

In conclusion, I have great concern regarding the **current levels of microwave radiation in North America. Instead of promoting wireless technology, we should be promoting wired technology and reserving wireless for situations where wired is not possible** (while one is traveling for example). Shortly after X-rays were discovered, they were used in shoe stores to determine shoe-size for young children. Fortunately, we recognized that X-rays were harmful and we restricted their use to essential medical diagnoses. We need to recognize that microwaves are also harmful and we cannot use this technology in a frivolous manner. With more frequencies being used, with the levels of radiation increasing, and with so little research on the long-term, low-level effects of this technology we are creating a potential time bomb. If smart meters are placed on every home, they will contribute significantly to our exposure and this is both unwise and unsafe."

I trust the "Report on Smart Meters" will prove useful to the ACC upcoming assessment of the safety of Smart Meters for Arizona.

Respectfully submitted,

Patricia Ferre
P O Box 433
Payson, AZ 85547

¹ HAVAS REPORT ON SMART METERS FOR CCST,
<http://www.magdahavas.com/havas-report-on-smart-meters-for-ccst/>

² HAVAS Submission to CCST "Report on Smart Meters".
<http://www.magdahavas.com/wordpress/wp-content/uploads/2011/01/Havas-Report-CCST-Smart-Meters.pdf>

Havas Submission to CCST "Report on Smart Meters".

For those interested, below is my invited submission to CCST as part of a *Technical Response Team*.

Date: October 12, 2010
From: Magda Havas, BSc, PhD
To: CCST

Submission on Smart Meters.

Item 1. Whether FCC standards for Smart Meters are sufficiently protective of public health taking into account current exposure levels to radiofrequency and electromagnetic fields.

In my opinion, the FCC standard for Smart Meters is **not** sufficient to protect public health. This is based on the following facts:

- 1.1 **Thermal vs. Non-thermal Debate.** The thermal vs. non-thermal debate is largely a red herring that has been perpetuated for decades and has influenced the type of research done in the United States. The FCC standard is based on a **thermal** effect. It was originally based on the amount of radiation that would heat an adult male in the US military exposed to radar. While the heating effect is not disputed, biological effects, some of which have adverse health consequences, occur well below the thermal guideline (Inglis 1970). As a consequence various countries in the world are opting for a "**biologically**" based guideline rather than a "**thermal**" guideline, which takes into account not only adult males in peak physical conditions but children, pregnant women, the elderly, and those who have developed electrohypersensitivity (EHS). I will return to the concept of EHS later.
- 1.2 **Guidelines** in Russia, Switzerland, Poland, and China are well below the FCC standard (i.e. 10 vs. 1000 microW/cm² or 1% of FCC guidelines). Some military and government insiders tried to get U.S. guidelines reduced decades ago but were not successful (Pollack and Healer 1967, Dodge 1969). Steneck et al. (1980) provides an excellent account of how the U.S. standards were established for radio frequency radiation.
- 1.3 **Our exposure to radio frequency radiation (RFR) is increasing exponentially** as we design more equipment that relies on higher frequencies in the electromagnetic spectrum. Prior to World War II, this type of radiation was negligible. Today we have radar (military, marine, aviation, and weather), we have cell phone antennas, radio and TV broadcast antennas, and a growing number of WiFi hotspots, citywide WiFi and Wi-Max antennas. Inside buildings we have cordless phones, many of which emit microwave radiation even when they are not being used; wireless alarm systems; wireless baby monitors, wireless computers, iPads, and Smart Phones that can connect to wireless internet or WiFi. More children are playing wireless video games than ever before and radio frequency identification devices (RFID) are placed into

merchandise to provide information to the manufacturer about consumer habits. The “smart meter” is just another source of exposure that will be placed on every home and in every apartment. Smart meters are being used to monitor use of electricity, gas and water. As part of this system, appliances are being designed to communicate directly with smart meters, all in a wireless mode, which will ultimately increase levels of radiation in the home.

- 1.4 I work with people who have become **electrically hypersensitive (EHS)** and I have received emails and phone calls from those who have had smart meters placed on their homes. They complain of ill health and many are unable to use the room closest to the smart meter. These individuals have no place to “hide” from the growing levels of electrosmog especially in densely populated urban centers. Sickness contributes to time off work and away from school, growing medical costs and a general poorer quality of life. Children are particularly vulnerable as are pregnant women and those with compromised immune systems. The presence of metal implants in the body (such as metal pins in bones) may concentrate the absorption of radiation at the location of implantation, inducing thermal effects from lower power densities than would ordinarily cause such harm (Massey 1979). Some implants, such as pace makers and deep brain stimulators for Parkinson’s disease, may malfunction and this can be fatal. In Switzerland about 5% of the population has EHS. If the same fraction of the population has EHS in the US that would come to a staggering 15 million people!

The symptoms following exposure to radio frequency radiation were labeled radiowave sickness and were first reported for those occupationally exposed in the former Soviet Union. These same symptoms are now referred to as electrohypersensitivity (EHS) and are experienced by a growing fraction of the population. They include . . .

“ . . . headache, eyestrain and tearing, fatigue and weakness, vertigo, sleeplessness at night and drowsiness during the day, moodiness, irritability, hypochondria, paranoia, either nervous tension or mental depression and memory impairment. After longer periods of exposure, additional complaints may include sluggishness, inability to make decisions, loss of hair, pain in muscles and in the heart region, breathlessness, sexual problems and even a decrease in lactation in nursing mothers. Clinically observed effects in persons voicing these complaints include trembling of the eyelids, fingers and tongue, increased perspiration of the extremities, [and] rashes . . .” (Massey, 1979).

- 1.5 In addition to sensitive people, Switzerland also identifies **Places of Sensitive Use** (German acronym is OMEN). These places include: living rooms; classrooms and kindergartens; hospitals and nursing homes; permanent jobs (where people spend more than 2.5 days per week); and playgrounds. For these OMEN sites, the Swiss government recommends that greater precaution be taken for long-term exposure to weak radiation. In these places, radiation from wireless microwave base stations (such as cordless phones or WLAN/WiFi) may exceed radiation from nearby cell phone base stations and hence these devices must generate emissions as low as possible. For more information visit <http://www.bag.admin.ch/themen/strahlung/00053/index.html?lang=en>

Item 2. Whether additional technology specific standards are needed for Smart Meters and other devices that are commonly found in and around homes, to ensure adequate protection from adverse health effects.

- 2.1 Technology specific standards are definitely needed** for Smart meters as well as cordless phones, DECT baby monitors, wireless routers, and all of the other devices that emit radio frequency radiation.

Massey, in a report published by Duke Law Journal in 1979, identifies nine variables that need to be considered when determining the impact of microwave radiation. These are “power density, intensity and relative phase of all field components, specific frequency ranges, waveform characteristics, exposure regimes, specific occupations, level of control over exposed populations, individual differences (age, sex, health, specific predisposing factors) and presence of other environmental stressors.” The current FCC guidelines do NOT take these into consideration.

- 2.2** We have evidence that **pulsed microwave frequencies**, that are generated by WiFi and cordless phones are more harmful than continuous wave and yet this is not considered in the FCC guidelines (Reno 1975).

The key microwave emitting devices in the home/office/school environment are:

Cordless phones (some are labeled DECT and others pulsed digital 2.4 GHz). These radiate all the time even when no one is using them. They should be replaced by wired phones or cordless phones currently available in Europe, which are “on-demand” phones that radiate only when the handset is not in the cradle of the base station. These phones are so dangerous that I recently submitted a Petition to the Auditor General of Canada to have DECT phones banned (Havas 2008).

The DECT baby monitor also radiates all the time, as does the receiver that is often carried on the Mother’s waist. Here we need a voice-activated baby monitor that is used in Europe.

Wireless Internet (WiFi or WLan) is not as common in Europe as they are in North America. There they prefer using wired service in the form of fiber optic and Ethernet connections. Germany hotels ask that you bring an Ethernet cables with you, as they don’t provide WiFi. The Swiss government is providing free fiber optics to schools provided they don’t install wireless routers.

- 2.3** An additional point I would like to make relates to **dirty electricity**.

Wires can act like antennas and the radiation produced by radio frequency generating devices can flow along and reradiate from wires both inside and outside the home. This contributes to dirty electricity and localized radiation exposure. Dirty electricity has been associated with cancers (Milham and Morgan 2008); health and behavior problems in schools (Havas and Olstad 2008); and both diabetes and multiple sclerosis (Havas 2006). From a human health perspective and to protect sensitive electronic equipment it is

important to maintain good power quality and to prevent radiation from smart meters flowing along wires.

In conclusion, I have great concern regarding the **current levels of microwave radiation** in North America. Instead of promoting wireless technology, we should be promoting wired technology and reserving wireless for situations where wired is not possible (while one is traveling for example). Shortly after X-rays were discovered, they were used in shoe stores to determine shoe-size for young children. Fortunately, we recognized that X-rays were harmful and we restricted their use to essential medical diagnoses. We need to recognize that microwaves are also harmful and we cannot use this technology in a frivolous manner. With more frequencies being used, with the levels of radiation increasing, and with so little research on the long-term, low-level effects of this technology we are creating a potential time bomb. If smart meters are placed on every home, they will contribute significantly to our exposure and this is both unwise and unsafe.

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Chronology:

On July 30, 2010, California State Assembly Member Jared Huffman (San Rafael) asked the California Council on Science and Technology (CCST) to provide an assessment of the safety of Smart Meters.

On August 16, 2010, CCST agreed to compile and assess the evidence available to address the following two issues:

1. Whether FCC standards for Smart Meters are sufficiently protective of public health taking into account current exposure levels to radiofrequency and electromagnetic fields.
2. Whether additional technology specific standards are needed for Smart Meters and other devices that are commonly found in and around homes, to ensure adequate protection from adverse health effects.

On October 4, 2010, I was invited to be part of a Technical Response Team and, as part of that team, I was asked to provide a written response to two key concerns mentioned above.

On October 12, 2010, I submitted my report to CCST.

On December 13, 2010, I was informed that CCST was not appending any documents to their report, nor were they making these documents available to others, but they were recognizing those who contributed.

On January 11, 2011, CCST released their report "Health Impacts of Radio Frequency from Smart Meters" on their website: <http://www.ccst.us/news/2011/20110111smart.php>. CCST is receiving public comments until January 31, 2011.